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NO. 3680 P. 1

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Docket No.: 12810-00232-US  
(PATENT)

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By: Sheng Qiu

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:  
Markus Siegert et al.

Application No.: 10/574,680

Confirmation No.: N/A

Filed: April 4, 2006

Art Unit: N/A

For: METHOD FOR THE DISTILLATIVE  
SEPARATION OF MIXTURES CONTAINING  
ETHYLENEAMINES

Examiner: Not Yet Assigned

LETTER

MS Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Attached is a copy of the International Preliminary Report on Patentability regarding the PCT counterpart of the above application. It is noted that all of the documents cited therein have already been cited in an Information Disclosure Statement in this application.

Dated:

Respectfully submitted,

By: Harold Pezzner  
Harold Pezzner

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## PATENT COOPERATION TREATY

NO. 3680-T/EI P. 24/011584

US-Cowally

## PCT

NOTIFICATION OF TRANSMITTAL  
OF COPIES OF TRANSLATION  
OF THE INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY  
(CHAPTER I OR CHAPTER II  
OF THE PATENT COOPERATION TREATY)  
(PCT Rules 44bis.3(c) and 72.2)

From the INTERNATIONAL BUREAU

To:

BASF AKTIENGESELLSCHAFT  
67056 Ludwigshafen  
ALLEMAGNE

Global Intellectual Property  
27. Sep. 2006  
crt

ASTUS

Date of mailing (day/month/year) 21 September 2006 (21.09.2006)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 0000054968	
International application No. PCT/EP2004/011584	International filing date (day/month/year) 15 October 2004 (15.10.2004)
Applicant BASF AKTIENGESELLSCHAFT et al	

El: Phase beendet 17.03.2006

## 1. Transmittal of the translation to the applicant.



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

## 2. Transmittal of the copy of the translation to the designated or elected Offices.

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

KR

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

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## 3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

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TRANSLATION

## PATENT COOPERATION TREATY

## PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>0000054968</b>	FOR FURTHER ACTION See Form PCT/PEA/416	
International application No. <b>PCT/EP2004/011584</b>	International filing date (day/month/year) <b>15.10.2004</b>	Priority date (day/month/year) <b>17.10.2003</b>
International Patent Classification (IPC) or national classification and IPC <b>C07C209/84, C07C209/86, B01D3/32, B01J19/32, C07D295/02</b>		
Applicant <b>BASF AKTIENGESELLSCHAFT</b>		

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>6</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>7</u> sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____ containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>	
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>	
Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPLA/ISP	Authorized officer
Facsimile No.	Telephone No.

Form PCT/PEA/409 (cover sheet) (January 2001)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/011584

Box No. 1 Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language \_\_\_\_\_ which is the language of a translation furnished for the purposes of:

- ☐ international search (Rule 12.3 and 23.1(b))  
☐ publication of the international application (Rule 12.4)  
☐ international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):

☐ the international application as originally filed/furnished

☒ the description:

pages 1-12 \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☒ the claims:

nos. \_\_\_\_\_ as originally filed/furnished

nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19

nos.\* 1-39 \_\_\_\_\_ received by this Authority on 11.08.2005 with letter of 09.08.2005

nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☒ the drawings:

sheets 1/2, 2/2 \_\_\_\_\_ as originally filed/furnished

sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages \_\_\_\_\_

☐ the claims, nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (specify): \_\_\_\_\_

☐ any table(s) related to sequence listing (specify): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages \_\_\_\_\_

☐ the claims, nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (specify): \_\_\_\_\_

☐ any table(s) related to sequence listing (specify): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

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## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/011584

Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
<b>1. Statement</b>			
Novelty (N)	Claims	1-39	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-39	NO
Industrial applicability (IA)	Claims	1-39	YES
	Claims		NO
<b>2. Citations and explanations (Rule 70.7)</b>			
D1: US 2004/220406 A1 (LANG ET AL.), 4 November 2004 (2004-11-04)			
D2: DE 199 33 850 A1 (BASF AG), 25 January 2001 (2001-01-25)			
D3: KAIBEL G: "DISTILLATION COLUMNS WITH VERTICAL PARTITIONS", CHEMICAL ENGINEERING AND TECHNOLOGY, WEINHEIM, DE, Vol. 10, 1987, pages 92-98, XP002939161, ISSN: 0930-7516			
D4: LESTAK ET AL.: "ADVANCES DISTILLATION SAVESE", CHEMICAL ENGINEERING, MCGRAW-HILL, ALBANY, NY, US, Vol. 7, July 1997 (1998-07), pages 72-76, XP001156299, ISSN: 0009-2460			
D5: SCHULTZ M A ET AL.: "REDUCE COSTS WITH DIVIDING-WALL COLUMNS", CHEMICAL ENGINEERING PROGRESS, AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, NEW YORK, US, Vol. 98, No. 5, May 2002 (2002-05), pages 64-71, XP001106017, ISSN: 0360-7275			
1. The present application relates to a method for separating ethylene amine-containing mixtures by distillation, the method being characterised in that separation is carried out in one or more dividing-wall columns. The ethylene amines to be			

Form PCT/IPEA/409 (Box No. V) (January 2004)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/011584

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability:  
citations and explanations supporting such statement

separated are ethylene diamine, piperazine, diethylene triamine, aminoethylethanol amine and/or monoethanol amine. The ethylene amine-containing mixture is a product obtained by reaction of MEOA with ammonia, followed by a partial or total separation of ammonia and water.

2. D1 discloses a method for purifying triethylene diamine by distillation, in which separation is carried out in a dividing-wall column. The triethylene diamine-containing mixture is, in particular, piperazine, ethylpiperazine, triethylene diamine and aminoethylpiperazine (see the passages cited in the search report) (E document)
3. D2 relates to a method for purifying triethylene diamine by fractionating distillation. The triethylene diamine-containing mixture is preferably obtained by reacting MEOA so as to produce a product which contains triethylene diamine and piperazine, then by reacting this product with an ethylating compound which contains at least one N and/or O atom (see the passages cited in the search report).
4. D3-D5 disclose the advantages of the use of one or more dividing-wall columns for the distillative separation of mixtures which contain three or more components. Dividing-wall columns make it possible to obtain pure products by a simple, economical and efficient method. High-quality products with

Form PCT/ISA/409 (Box No. V) (January 2004)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

regards to colour, colour stability, odour and purity are thus produced (see the passages cited in the search report).

## Novelty

5. The subject matter of claims 1-39 is novel (PCT Article 33(2)). The prior art does not disclose a method for the distillative separation of ethylene amine-containing mixtures and characterised in that the separation is carried out in one or more dividing-wall columns (see paragraphs 3 and 4).

## Inventive step

6. The subject matter of claims 1-39 does not involve an inventive step (PCT Article 33(3)).
- 6.1 Methods for the **distillative separation of ethylene amine-containing mixtures** are known from the prior art (see D2).
- 6.2 The subject matter of claims 1-39 differs from the known methods in that one or more dividing-wall columns are used, and in that the ethylene amines are ethylene diamine, piperazine, diethylene triamine, aminoethylethanol amine and/or monoethanol amine.
- 6.3 D3 and D4 disclose the advantages of the use of one or more dividing-wall columns for the distillative separation of mixtures which contain

Form PCT/ISA/409 (Box No. V) (January 2004)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/011584

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability:  
statements and explanations supporting such statement

three or more components. Dividing-wall columns make it possible to obtain pure products by a simple, economical and efficient method. High-quality products with regard to colour, colour stability, odour and purity are thus produced.

- 6.4 A person skilled in the art would therefore consider the inclusion of this feature, i.e. the use of dividing-wall columns, in the method disclosed in D2, a conventional measure to improve the method described in D2 (separation of ethylene amine-containing mixtures).

- 6.5 No inventive step (PCT Article 33(3)) is recognised in the subject matter of claims 1-39.

## Observations

7. Claims 24, 26, 27, 30 and 36 do not meet the requirements of PCT Article 6 because the definition of the subject matter for which protection is sought is unclear. The claims attempt to define the subject matter in terms of the result to be achieved, and in doing so merely state the problem addressed, without indicating the technical features necessary to achieve this result.
8. Contrary to PCT Rule 5.1(a)(ii), the description does not cite documents D2-D5 or indicate the relevant prior art disclosed therein.
9. The description has not been brought into line with the amended claims.

Form PCT/PEA/409 (Box No. V) (January 2004)



INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/011584

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement